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ORIGINAL PAPER

The importance of perceived autonomy support for the psychological health and work satisfaction of health professionals: Not only supervisors count, colleagues too!

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Abstract Previous studies show that supervisors' autonomy-supportive style predicts greater psychological health (Baard et al. in J Appl Soc Psychol 34:2045–2068, 2004; Blais and Brière 1992; Lynch et al. in Prof Psychol Res Pract 36:415–425, 2005) and lower psychological distress (Deci et al. in Personal Soc Psychol Bull 27:930–942, 2001). The goal of the present study is to extend these results and investigate the contribution of colleagues' perceived autonomy support in the prediction of health professionals' work satisfaction and psychological health. The combined impact of supervisors' and colleagues' perceived autonomy support is also examined. A sample of 597 health professionals from the province of Quebec (Canada) completed a questionnaire, which included measures of perceived supervisors' and colleagues' autonomy support and outcome variables. Results confirm that supervisors' and colleagues' perceived autonomy support predict health professionals' work satisfaction and psychological health. Results also show that colleagues' perceived autonomy support adds to the prediction of health professionals' work satisfaction, subjective well-being, and suicidal ideation above and beyond supervisors' perceived autonomy support.

Keywords Health professionals · Autonomy support · Psychological health · Work satisfaction · Intent to leave · Supervisors · Colleagues · Medicine · Dentists · Veterinarians · Self-determination theory

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Introduction

Research on occupational stress has been consistent in showing that health professionals are an occupational group at risk of psychological impairments (e.g., Hem et al. 2005; Stack 2001). Findings from various countries indicate that dentists, physicians, and veterinarians, three related health care professions, are affected by psychological difficulties (e.g., Hem et al. 2005; Wasserman 1992) in addition to experiencing career and job dissatisfaction (e.g., Brown and Gunderman 2006). Drawing on self-determination theory (Deci and Ryan 1985, 2000), the present study focuses on these health professions to better understand these difficulties. More specifically, the present study investigates the influence of the interpersonal work context, in terms of supervisors' and colleagues' perceived autonomy support, on health professionals' work satisfaction and psychological health. It is proposed that autonomy support from supervisors and from colleagues make unique contributions to the prediction of health professionals' work satisfaction and psychological health.

Health professionals' work satisfaction and psychological health

Empirical evidence points to work dissatisfaction among professionals in health-care occupations. For instance, research reveals that 20–33% of physicians report being dissatisfied with their career (Brown and Gunderman 2006; Kassirer 1998). Similarly, 40% of young physicians mention that they would not go through medical school again if given the choice (Brown and Gunderman 2006). Research further indicates that dissatisfaction appears very early in physicians' career. For example, a third of medical residents report not being happy with their career choice (34%,

Shanafelt et al. 2002) and a third contemplated quitting during their first months of residency (34%, Clark et al. 1984). A longitudinal study shows that 10 years after graduation, about one quarter of veterinarians feel that their career has not fulfilled their expectations. Indeed, almost half say that they would not become veterinarians again if given the choice, while 20% actually left the veterinary practice (Heath 2002b).

In addition to work dissatisfaction, health professionals also experience psychological difficulties. Indeed, there is increasing evidence that health professionals experience high levels of stress and psychological distress (Firth-Cozens 2001). For example, 43% of medical residents find residency training to be "quite a bit" up to "extremely" stressful (Cohen and Patten 2005). A large part of dentists perceive dentistry as being a very stressful occupation (83%, Baran 2005), and more than two-thirds of experienced veterinarians still find that their work causes them a considerable amount of stress (72–73%, Heath 2002b; Reijula et al. 2003). Moderate to high estimates of burnout[1] prevalence are also observed with medical residents (see Thomas 2004 for a review), dentists (Ahola and Hakanen 2007; Puriene et al. 2008), physicians (Maslach and Jackson 1982; Eckleberry-Hunt et al. 2009), and veterinarians (Reijula et al. 2003). In particular, a recent survey reveals that almost half of Canadian physicians between 35 and 44 years old report suffering from fatigue or burnout (Maranda et al. 2006). Physicians also report lower life satisfaction than their peers in other fields of high education (Tyssen et al. 2009). In a large-scaled Australian study, approximately a third of veterinarians report poor psychological health, and, overall, they experience higher anxiety levels than the general population (Fritschi et al. 2009). Similarly, an important proportion of dentists complain of anxiety (Dunlap and Stewart 1982, as cited in Rada and Johnson-Leong 2004; Puriene et al. 2008) and depression (Myers and Myers 2004; Puriene et al. 2008). More dramatically, some studies show that dentist, physicians and veterinarians have a higher suicide rate than graduates in other fields and than the general population (e.g., Boxer et al. 1995; Hem et al. 2005; Schernhammer and Colditz 2004; Stack 1996, 2001; Wasserman 1992). Finally, research shows that psychological impairments are not limited to professionals, but are also experienced by the students of these professions. For instance, high prevalence of distress is found among dental (Ey et al. 2000; Henning et al. 1998), medical (see Dyrbye et al. 2006 for a review), and veterinary students (Hafen et al. 2006).

Different factors have been suggested to explain the difficulties encountered by students and professionals in dentistry, medicine, and veterinary medicine. Most have been identified by asking health professionals to indicate which stressors they thought contribute the most to their difficulties (Kent 1987). The most recurrent stressors reported by health professionals are heavy workload, patient and business management, financial concerns, limited amount of personal time, exposure to patients' suffering and deaths or to animal euthanasia, the possibility of making professional mistakes, and threat of lawsuits (e.g., Bartram et al. 2009; Bourassa and Baylard 1994; Dyrbye et al. 2006; Firth-Cozens 1987, 2001; Fritschi et al. 2009; Godwin et al. 1981). However, when these stressors are actually measured and correlated with psychological health indicators, empirical evidence often fails to confirm these hypothesized associations (Baldwin et al. 1997; Thomas 2004; Tyssen and Vaglum 2002). For example, although medical residents identify workload as the most stressful aspect of their job, no clear association is found between the number of worked hours (or patients) and residents' emotional disturbance (Baldwin et al. 1997; Firth-Cozens 2001; Thomas 2004; Tyssen and Vaglum 2002). Researchers also considered demographic (e.g., gender, generalists vs. specialists; Brown and Gunderman 2006; Collier et al. 2002) and personality characteristics (e.g., perfectionism, self-criticism, and neuroticism; Firth-Cozens 1987; Godwin et al. 1981; Tyssen et al. 2004) but inconsistent results or weak associations are observed (Thomas 2004; Tyssen and Vaglum 2002). In addition, many studies are atheoretical, rely on non-validated measures to assess psychological health, and do not control for possible confounders (Thomas 2004). Finally, most studies focus solely on psychological distress, thereby ignoring the positive pole of psychological health (Tyssen et al. 2009).

In an effort to address these limitations, Moreau and Mageau (2011b) used an empirically tested theoretical framework and validated measures of psychological health to examine individual (i.e., self-awareness, tasks self-concordance) and contextual determinants (i.e., perceived supervisors' autonomy support, stressors related to medicine, and stressful life events) of medical residents' psychological health and suicidal ideation. They find that perceived supervisors' autonomy support at work, through its impact on self-awareness and tasks self-concordance, predicts medical residents' psychological health and suicidal ideation above and beyond common stressors found in the literature (e.g., workload, life events). These results demonstrate the importance of perceived autonomy support for professionals' psychological health.

[1] Burnout is defined as a pathological syndrome characterized by emotional exhaustion, depersonalization, cynicism, and feeling of inefficacy (Maslach et al. 1997).

Autonomy support

Self-determination theory (Deci and Ryan 1985, 2000) posits that psychological health and optimal functioning are facilitated by interpersonal contexts that support people's autonomy. Autonomy is defined as the sense of choice and willingness one experiences when one behaves in a way that is congruent with self-endorsed values and interests (Deci et al. 2006; Williams et al. 2006). Being autonomous is thus different from being independent or free from responsibilities. For example, taking responsibility for patients' welfare, even if it means to submit to several behavioral restrictions (e.g., long working hours), can feel highly autonomous. Indeed, health professionals who understand and endorse the importance of these behavioral restrictions for their patients' welfare and who are allowed to voice their opinion and feelings about them experience a sense of coherence between their values and behaviors. They thus feel autonomous when assuming their responsibilities. According to self-determination theory, an autonomy-supportive context refers to a social environment where others are considered as separate individuals capable of self-determination. Autonomy support thus encompasses behaviors such as inquiring and acknowledging others' feelings and perspectives, giving a meaningful rationale for a request, and maximizing people's sense of self-initiation and choice (Deci et al. 1994; Grolnick 2003; Koestner et al. 1984; Ryan 2005). Defined in this way, autonomy support differs from permissiveness (i.e., lack of structure) and neglect (i.e., lack of involvement; Joussemet et al. 2008). In controlling contexts, which are the opposite of autonomy-supportive environments, others are considered as pawns that should be controlled to obtain a certain outcome (deCharms 1968; Deci and Ryan 1987). Controlling behaviors are thus aimed at pressuring others to think, feel, or be in specified ways, thereby ignoring the person's needs and feelings (Deci and Ryan 1985; Ryan 2005).

Empirical evidence confirms that autonomy-supportive contexts have a significant positive impact on individuals' psychological health. For example, autonomy support has been related to more positive affect (Assor et al. 2002; Black and Deci 2000; Gurland and Grolnick 2003; Ryan et al. 1983; Williams and Deci 1996), less negative affect (e.g., Assor et al. 2002; Black and Deci 2000; Gurland and Grolnick 2003; Ryan et al. 1983; Williams et al. 1994), more well-being (Chirkov and Ryan 2001; Niemiec et al. 2006), less depressive symptoms (Niemiec et al. 2006), and less psychological distress (Kennedy et al. 2004; Williams et al. 2005). These results have been found using experimental (e.g., Gurland and Grolnick 2003; Ryan et al. 1983) and correlational designs (e.g., Assor et al. 2002; Black and Deci 2000), in various life domains (see Moreau and Mageau 2011a for a review), and among people from different age and culture (e.g., Chirkov and Ryan 2001; Deci et al. 2001). In the work context, autonomy support has been associated with more psychological health (Baard et al. 2004; Blais and Brière 1992; Lynch et al. 2005; Moreau and Mageau 2011b), less psychological distress (Deci et al. 2001), and lower suicidal ideation (Moreau and Mageau 2011b). Previous studies also show that supervisors' autonomy-supportive style predicts work-related outcomes such as greater work satisfaction (Blais and Brière 1992; Deci et al. 1989), engagement (Deci et al. 2001) and performance (Baard et al. 2004), as well as better acceptance of organizational change (Gagné et al. 2000) and trust toward the organization (Deci et al. 1989).

Self-determination theory (Deci and Ryan 1985, 2000) proposes that autonomy support is not only important in hierarchical relationships, but that autonomy support from any significant relationships should lead to positive outcomes. Colleagues may thus be an important source of autonomy support that health-care professionals could benefit from. The present study therefore aims at examining the impact of colleagues' autonomy support on health professionals' psychological health and work outcomes. Yet, given that most young professionals also have supervisors (e.g., team leader, administrators) and that a strong positive relationship is found between supervisors' autonomy support and residents' psychological health (Moreau and Mageau 2011b), both supervisors and colleagues' impact on health professionals' psychological health and work outcomes are examined. In the present study, supervisors refer to immediate supervisors or more experienced people. In contrast, colleagues refer to people with similar levels of experience who hold positions at the same hierarchical level and with whom no supervision is implied. Supervisors and colleagues thus differ in status, authority, and role. For example, while supervisors principally serve a teaching and an evaluative function, colleagues mostly provide help and experience sharing.

We are not aware of any study guided by self-determination theory that has looked specifically at the impact of colleagues' autonomy support on workers' psychological health and work-related outcomes. Yet, some evidence suggests that relationships with colleagues should influence these outcomes. Indeed, although most research on autonomy support has focused on hierarchical relationships involving two people who differed in terms of authority or expertise such as parent-child, teacher-student, manager-subordinate or doctor-patient relationships (Deci et al. 2006), a few recent studies have been concerned with autonomy support in mutual relationships (e.g., friends, spouses, relatives). These studies confirm that the positive outcomes associated with autonomy support

can also be observed in more egalitarian relationships. For example, receiving autonomy support from a friend predicts perceptions of relationship quality, satisfaction within the relationship, experience of positive affect, and psychological well-being (Deci et al. 2006). Perceived autonomy support from friends and relatives is also related to lesser depression as well as to higher well-being and life satisfaction among residents in a nursing home (Kasser and Ryan 1999). Moreover, in the context of an intervention aimed at helping patients to quit smoking, autonomy support from health care practitioners and from important others (e.g., friends, relatives) independently predict change in patients' perceived autonomy and perceived competence toward smoking cessation (Williams et al. 2006). In the context of a similar intervention for helping patients eat a more healthy diet, autonomy support from important others is a significant predictor of change in objectively measured dietary outcomes (e.g., percentage of calories intake coming from fat), while autonomy support from the health care practitioners is not (Williams et al. 2006). These results suggest that autonomy support in mutual relationships has a unique contribution to various positive outcomes.

Other studies in the context of health care occupations point to the protective role of having supportive colleagues for health professionals' psychological health and work-related outcomes. For instance, coworkers' support, defined in terms of coworkers' helpfulness, sharing of knowledge and information, and creativity in problem-solving, is related to lower levels of emotional exhaustion, a constituent of burnout, and to lower intent to leave among health care workers (Ducharme et al. 2008). Maslach and Jackson (1982) also found that talking with colleagues about encountered difficulties serves to counteract burnout among physicians. Similarly, dentists who work with fewer colleagues report lower work engagement and higher burnout (Croucher et al. 1998; Denton et al. 2008) than those who work in larger teams. Moreover, the implementation of teamwork in a medical clinic has been shown to be associated with an increase in health workers' job satisfaction (Roth et al. 2009). Conversely, poor relationships with colleagues are associated with higher burnout rates in medical residents (Eckleberry-Hunt et al. 2009) and lower well-being in veterinarians (Bartram et al. 2009). Finally, physicians who committed suicide are found to have had less emotional support from their colleagues (Council on Scientific Affairs 1987). Bringing research on autonomy support in mutual relationships and on colleagues' general support together, we propose that colleagues will be an important source of autonomy support that will be associated with positive outcomes at work and greater psychological health.

Additive effect

Previous studies suggest that the effect of supervisors' and colleagues' autonomy support may be additive. Indeed, in the self-determination literature, Williams et al. (2006) found that health care providers' and significant others' autonomy support have an additive effect on health outcomes in the context of a smoking cessation intervention. Similarly, perceived autonomy support from fathers and mothers have a unique and additive contribution to the prediction of their adolescents' well-being and psychological distress (Niemiec et al. 2006). Other studies in the work domain also show that perceived supervisor and coworker support, defined as supervisor's and coworker's instrumental (work-related) and emotional assistance (Thoits 1985), have an additive effect on job satisfaction (Ng and Sorensen 2008). In light of these findings, it is expected that supervisors' and colleagues's perceived autonomy support will have an additive effect on positive outcomes at work and psychological health among health professionals.

The present research

The goal of the present research is to use self-determination theory as a theoretical framework from which to study supervisors' and colleagues' perceived autonomy support, psychological health, and work-related outcomes among students in training and recent graduates in health professions. This population was chosen because although psychological impairments and work dissatisfaction can be observed throughout all stages of health professionals' career, these difficulties are more salient among students in practicum and professionals at the beginning of their career (e.g., Bartram et al. 2009; Fritschi et al. 2009; Reijula et al. 2003; Simpson et al. 1983; Tyssen and Vaglum 2002; Tyssen et al. 2009). Difficulties may be more salient among less experienced health professionals for two reasons. First, it is during their first years of practice that professionals must adjust their expectations about their chosen occupation. Unrealistic expectations, especially about relationships with patients, colleagues, and organizations, are hypothesized to be important predictors of negative cognition and feelings (Sotile and Sotile 2002). Medical residents who feel that their new tasks and responsibilities (e.g., paperwork, patient and business management) are not concordant with their values also report lower levels of psychological health (Moreau and Mageau 2011b). Second, less experienced professionals are at higher risk of experiencing adaptation difficulties because they are less secure about their competencies and their role. Being more likely to rely on their work environment for cues about their level of competence, they should be more likely to be affected

by their work environment. Evidence from a longitudinal study shows that the quality of support provided by employers and the workplace when veterinarians first enter the profession greatly influences their work satisfaction throughout their career (Heath 2002b). Taken together, these studies point to the importance of this pivotal period.

The present study extends Moreau and Mageau's (2011b) work in three significant ways. First, we seek to verify if the positive link between supervisors' autonomy-support and psychological health found in the context of medicine (Moreau and Mageau 2011b) will remain significant in a larger sample, which includes students in training and recent graduates in dentistry, medicine, and veterinary medicine. More specifically, we expect that perceived supervisors' autonomy support will predict health care professionals' psychological health in this extended sample. According to the most recent conceptualization of psychological health (Massé et al. 1998; Ware and Sherbourne 1992; World Health Organization 2009), psychological health is defined as both the absence of ill-being (i.e., absence of psychological distress) and the presence of positive states (i.e., well-being). Given the particular importance of suicidal ideation for the population under study, this outcome is also assessed independently. Suicidal ideation is defined as one's thoughts about death, suicidal behaviors, and intent (Reynolds 1991) and is considered an important precursor of suicidal behaviors (Linehan 1981). In addition, based on past research on autonomy support (e.g., Deci et al. 1989), we expect supervisors' perceived autonomy support to also predict work-related outcomes, i.e., work satisfaction and intention to leave. Work satisfaction is defined as a person's global cognitive evaluation of the quality of his/her worklife (Blais et al. 1991). Intent to leave refers to a person's intention to leave his/her current work setting (O'Reilly et al. 1991), or to change profession or specialty. These outcomes (i.e., subjective well-being, psychological distress, suicidal ideation, work satisfaction, and intent to leave) were chosen to obtain a broad assessment of health professionals' adjustment both at work and in their life in general. Given that stressful life events and sociodemographic variables are found to be related to psychological impairments in some studies (Tyssen and Vaglum 2002), we control for the impact of life stress and sociodemographic variables (i.e., gender, age, profession, career stage, and worked hours per week) on the outcome variables.

Second, we investigate if the beneficial outcomes associated with supervisors' autonomy support in past research may also be observed with colleagues. More specifically, we expect that perceived colleagues' autonomy support will predict health professionals' work-related outcomes (i.e., work satisfaction and intent to leave) and psychological health (i.e., subjective well-being, psychological distress, and suicidal ideation) while controlling for the impact of life stress and sociodemographic variables.

Third, we examine whether receiving autonomy support from colleagues contributes to psychological health and work-related outcomes above and beyond what can be explained by supervisors' perceived autonomy support. Given that previous research on authority figures' and peers' autonomy support has mostly reported additive effects, we predict that the effect of supervisors' and colleagues' autonomy-supportive style will be additive.

Method

Participants

Participants were 597 newcomers (133 men, 443 women, 21 not specified) in dentistry ($n = 132$), medicine ($n = 393$), and veterinary medicine ($n = 72$) from the province of Quebec (Canada). They were either students doing their practicum ($n = 98$), residents in medicine ($n = 333$),[2] or new professionals who had been practicing for less than 7 years ($n = 143$; 23 not specified). The mean age was 27.1 years old ($SD = 3.8$) and participants worked an average of 54 h per week ($SD = 15.1$) in different settings such as hospitals, private practices, and universities. The majority earned between $30,000 and $59,999 CAD (61.5%), were born in Canada (86.6%), and completed the French version of the questionnaire (91.3%).

Procedure and measures

Participants were recruited by mail or email through their student or professional union. All participants were either randomly selected from their respective population (i.e., dentists) to receive an invitation or all members of the population were invited to participate (i.e., veterinarians, medical residents, and students in dentistry, in veterinary medicine and in medicine). Participants were first informed that a study aimed at better understanding the different factors influencing professionals' adaptation when they entered the profession was being carried out. They were then invited to complete the English or French version of either a web-based ($n = 503$; 84.3%) or paper ($n = 94$; 15.7%) questionnaire depending on which contact information was available. Specifically, new professionals in dentistry received a paper questionnaire and other participants (i.e., veterinarians, medical residents, and students in dentistry, in veterinary medicine and in medicine) completed

[2] This sample of medical residents is presented at length in Moreau and Mageau's (2011b) article.

a web-based questionnaire. The approximate response rate (15%), although somewhat lower than expected, is acceptable given that participants were not compensated for their participation and that they completed their questionnaire on their own time rather than in a close setting such as a class or at work.

The questionnaire comprised the following measures. When needed, instruments were translated using the back-translation procedure proposed by Vallerand (1989).

Perception of supervisors' and colleagues' autonomy support

The Perceived Autonomy Support Scale for employees (PASS-E; Moreau and Mageau 2011b, adapted from the Perceived Parental Autonomy Support Scale; P-PASS, Mageau et al. 2011) was used to measure participants' perceptions of autonomy support. The original P-PASS is reliable (e.g., Cronbach's alphas ranging from .76 and .94), valid (i.e., good convergent, divergent and predictive validity) and has a sound factor structure (i.e., all autonomy-supportive and controlling behaviors loaded on their respective first-order factor, which loaded on their respective second-order factor, i.e., the autonomy support or control factor; all loadings were higher than .72; the autonomy support and control factors were negatively correlated, for mothers, $r = -.72$ and fathers, $r = -.75$; Fournier et al. 2010, Mageau et al. 2011). Moreau and Mageau (2011b) also tested the factor structure of the PASS-E using structural equation modeling. Model fit indices confirmed that the PASS-E yields a two second-order factor structure, χ^2 (181, $N = 313$) = 533.06, $P < .001$, NC = 2.95, CFI = .92, NNFI = .90, RMSEA = .08, SRMR = .06. Indicators all loaded on their respective first-order factor with a minimum loading of .62 and without cross-loadings. In addition, second-order factors adequately represented the correlations pattern among the first-order factors. All first-order factors loaded on their respective second-order factor with a minimum loading of .85. The autonomy support and psychological control factors were strongly negatively correlated, $r = -.67$.

In the present study, the PASS-E was used to measure participants' perceptions of their supervisors' and colleagues' autonomy support (nine items; $\alpha = .90$ for supervisors, $\alpha = .87$ for colleagues) and use of psychological control (twelve items; $\alpha = .93$ for supervisors, $\alpha = .90$ for colleagues). Although seven items were slightly changed to better capture the particular nature of relationships with colleagues, their significance remained the same. For example, "When my supervisors offer me a reward, I have the unpleasant feeling that I owe them something in return" was changed to "When my colleagues do me a favor, I have the unpleasant feeling that I owe them something in return". Autonomy support included items that tapped supervisors' or colleagues' provision of choices (e.g., three items, "Within certain limits, my supervisors/colleagues give me the freedom to choose how and when I will execute my tasks"), provision of a rationale for their demands and rules (e.g., three items, "When my supervisors/colleagues ask me to do something, they explain why they want me to do it"), and inquiries about and acknowledgement of others' feelings and perspectives (e.g., three items, "My supervisors/colleagues take the time to listen to my opinion and my point of view when I disagree with them"). The perceptions of psychological control subscale included items that measured supervisors' or colleagues' controlling behaviors such as giving orders (e.g., three items, "My supervisors/colleagues do not take the time to ask me to do something, they order me to do it"), inducing guilt (e.g., three items, "My supervisors/colleagues try to motivate me by making me feel guilty for not doing enough"), using threats (e.g., three items, "At times, my supervisors/colleagues intimidate or blackmail me in order to make me do certain tasks"), and manipulating others by offering rewards (e.g., three items, "When my supervisors offer me a reward, I have the unpleasant feeling that I owe them something in return"; When my colleagues do me a favour, I have the unpleasant feeling that I owe them something in return). Participants indicated the extent to which each item corresponded to their supervisors' or colleagues' behaviors on a scale ranging from 1 (*Do not agree at all*) to 7 (*Very strongly agree*). Participants who were supervised by more than one person and who had more than one colleague were asked to answer the scale according to the general way in which they were treated by (1) their supervisors and (2) their colleagues in the last month. This procedure was chosen to evaluate participants' general perception of their supervisors' and colleagues' autonomy support without making the questions too repetitive. Past research shows that people are capable of deriving a general judgment about a target (e.g., their supervisors or their colleagues) from specific, and sometimes contradictory, pieces of informations (Anderson 1968).

Scores on all autonomy-supportive subscales were averaged, as well as scores on all psychological control subscales. According to Deci and Ryan (1985, 2000), autonomy support and psychological control are two interpersonal styles that lie on opposite ends of a same theoretical continuum, that of supporting versus thwarting a person's autonomy. Empirical evidence confirms that the negative correlation between autonomy support and psychological control is quite high, i.e., $r = -.68$, $P < .001$ (Soenens et al. 2007). In the present study, perceived autonomy support and perceived psychological control were also highly and negatively correlated for supervisors

($r = -.61$) and for colleagues ($r = -.55$). Autonomy support indices were thus created for both supervisors ($M = 5.40$; $SD = .97$) and colleagues ($M = 5.96$; $SD = .70$) by reversing psychological control scores and averaging them with autonomy support scores. The reliability of the autonomy support index is high (overall Cronbach's $\alpha = .94$ for supervisors and .92 for colleagues).

Work satisfaction

Work satisfaction was measured with the Work Satisfaction Scale (Blais et al. 1991), which is an adaptation from the Satisfaction with Life Scale (Diener et al. 1985; French version by Blais et al. 1989). This five-item scale assesses participants' global cognitive evaluation of the quality of their work context (e.g., "I am satisfied with my work") using a seven-point scale (*Do not agree at all* to *Very strongly agree*). The scale showed high reliability (Cronbach's $\alpha = .91$).

Intent to leave

A scale adapted from O'Reilly et al. (1991) was used to measure participants' intent to leave their work environment. This four-item scale measures the extent to which participants would prefer another more ideal job and the extent to which they intend to remain in their current work setting. This scale has been successfully used in previous studies, notably with new employees and interns (e.g., Cable and Judge 1996; O'Reilly et al. 1991). Intent to leave has also been shown to be a strong predictor of actual turnover among physicians (Buchbinder et al. 2001). Participants were instructed to think about their current work setting or practicum and rate each item using a seven-point Likert-type scale ranging from *Not at all* to *Extremely* (e.g., "If you had the choice, to what extent would you like to still be working in this setting three years from now?"). Participants with more than one work setting were asked to complete the scale while thinking about the work environment that appeared the most significant to them. Two items were added to assess the extent to which participants had thought about changing specialty and profession. The scale had adequate internal consistency ($\alpha = .84$).

Psychological health

In line with past research in organizational psychology (e.g., Massé et al. 1998; Ware and Sherbourne 1992) and the definition of mental health adopted by the World Health Organization (2009), psychological health was conceptualized as the absence of distress (or disease) and the presence of well-being. Both subjective well-being and psychological distress were thus measured. Given the particular importance of suicidal ideation for the population under study, this indicator of high psychological distress is also assessed independently.

Subjective well-being Measures of life satisfaction and positive affect were used to assess subjective well-being. The Satisfaction with Life Scale (Blais et al. 1989; Diener et al. 1985) was used to evaluate participants' life satisfaction (e.g., "In most ways my life is close to my ideal"). This five-item scale assesses participants' level of satisfaction with their life in general using a 1 (*Strongly disagree*) to 7 (*Strongly agree*) Likert-type response scale. The reliability of this scale was very good ($\alpha = .90$, $M = 5.25$, $SD = 1.31$). The Positive and Negative Affect Schedule (PANAS; Watson et al. 1988) was used to measure participants' level of pleasant affect (ten items; e.g., enthusiastic, inspired). Participants indicated the extent to which they had felt these emotions during the last two weeks using a five-point scale (*Very slightly or not at all* to *Extremely*). As found in validation studies (Watson et al. 1988), the positive affect subscale showed high reliability, with Cronbach's alphas of .91 ($M = 3.48$, $SD = .76$). A subjective well-being index was computed by taking the mean of the standardized scores of the life satisfaction scale and the positive affect subscale.

Psychological distress Psychological distress was assessed via the negative affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson et al. 1988) and the anxiety and depression subscales of the General Health Questionnaire (Goldberg and Hillier 1979). The negative affect subscale contains ten items such as upset, nervous, and guilty. Participants rated each item using the same response scale as the one used to assess positive affect. The negative affect subscale showed a high reliability, with a Cronbach's alpha of .91 ($M = 2.44$, $SD = .82$). The 28-item version of the General Health Questionnaire (GHQ-28; Goldberg and Hillier 1979) was used to measure anxiety and depression. This frequently used questionnaire, which has been employed with different working populations (Jackson 2007), assesses the extent to which participants experience the presence of different symptoms. More specifically, in this study, the anxiety (seven items; e.g., "Have you lost much sleep over worry?") and the depression subscales (seven items; e.g., "Have you felt that life is entirely hopeless?") were used. Participants were asked to indicate how frequently they had experienced each symptom over the past two weeks on a four-point Likert-type scale ranging from 1 (*Not at all*) to 4 (*Much more than usual*). These subscales have been shown to be both reliable and valid in past studies (e.g., Goldberg and Hillier 1979; Goldberg et al. 1997), and they were

highly reliable in the present research (anxiety, $\alpha = .89$; depression; $\alpha = .89$). A psychological distress index was created by taking the mean of the standardized scores for the negative affect scale, the anxiety, and the depression scales.

Suicidal ideation Suicidal ideation is defined as one's thoughts about death, suicidal behaviors, and intent (Reynolds 1991). The frequency of suicidal ideation is related to the likelihood of suicide attempts (Schotte and Clum 1982). As such, suicidal ideation may be considered an extreme indicator of psychological distress. In the present study, suicidal ideation was assessed with the Scale for Suicide Ideation (SSI; de Man et al. 1987). The SSI has been validated with an adult population in Quebec. This scale showed satisfactory reliability ($\alpha = .92$) and validity indices (de Man et al. 1987, 1993). An abridged version (five items; e.g., "How would you rate your wish to die?"), which measured respondents' attitude toward living and dying, was used for this study. Items included in the abridged version showed good reliability (e.g., item-total score correlation between .51 and .67; Beck et al. 1979) and strongly loaded on a same factor in validation studies (loadings between .69 and .83, Beck et al. 1979; loadings between .57 and .76, de Man et al. 1987). As a preventive measure, contact information for suicide prevention help phone lines and various mental health services was provided at the end of the scale as well as at the end of the questionnaire. A value of 0, 1 or 2 was associated with each response according to the scale's scoring key. Scores were averaged to create a suicidal ideation variable, which ranged from 0 (low) to 2 (high ideation).

Stressful life events

General stress was measured by evaluating the number of stressful events participants experienced in the past year (Tyssen et al. 2000). This scale consists of a list of twelve life events that could potentially be encountered at the participants' life stage (e.g., separation, moving to a new place, having children) and that may represent a source of stress. This scale was successfully used in previous studies with medical residents (e.g., Tyssen et al. 2004, 2009). In the present research, one item (i.e., immigration) was added to the original list because a small proportion of Quebec' health professionals are individuals who came from other countries to do their training or to work in Canada. Participants also had the possibility to indicate other stressful life events they had experienced during the last 12 months. Each item was coded as present (1) or not present (0) and these scores were summed.

Sociodemographic measures

Participants were asked to specify their gender, age, career stage, and workload (i.e., number of working hours per week).

Results

Preliminary analyses and descriptive statistics

Means, standard deviations, range, and correlations between variables are presented in Table 1. Both supervisors' and colleagues' perceived autonomy support were significantly correlated with the five outcome variables. Specifically, both supervisors' and colleagues' perceived autonomy support were positively associated with health professionals' work satisfaction and subjective well-being, while being negatively related to intent to leave, psychological distress, and suicidal ideation. Overall, univariate values of kurtosis and skewness were generally adequate with most values ranging from -1.0 to $+1.0$ (mean kurtosis $= 0.7$ and mean skewness $= -0.2$; Muthén and Kaplan 1985). As expected, suicidal ideation was an exception, with a skewness of 2.6 and a kurtosis of 6.7.[3]

Main analyses

To test the relations among supervisors' and colleagues' perceived autonomy support, health professionals' work-related outcomes (i.e., work satisfaction and intent to leave), and psychological health indicators (i.e., subjective well-being, psychological distress, and suicidal ideation), we conducted three series of hierarchical regression analyses. We first examined the links between supervisors' perceived autonomy support and each outcome variable while controlling for stressful life events and demographic variables. When demographic variables were dummy coded, we followed Hardy's (1993, as cited in Cohen et al. 2003) recommendation and used the largest group as the reference category. Second, we verified the predictive value of colleagues' perceived autonomy support for the same set of outcomes, while controlling for the same covariates. Finally, we looked at the combined impact of supervisors' and colleagues' perceived autonomy support on the five outcome variables. For each set of analyses, Bonferroni correction was used to control for the inflation of Type I error probabilities that occurs with multiple

[3] Applying a square-root transformation to the suicidal ideation scores would change their distribution to a more normal shape. However, given that the results are basically the same with or without this transformation, we chose to use the original suicidal ideation scores for simplicity.

Table 1 Descriptive statistics and intercorrelations

	Variable	1	2	3	4	5	6	7	8
1.	Supervisors' autonomy support	–	.63***	.59***	−.55***	.52***	−.47***	−.30***	−.13**
2.	Colleagues' autonomy support		–	.42***	−.35***	.40***	−.33***	−.30***	−.07
3.	Work satisfaction			–	−.69***	.69***	−.49***	−.29***	−.14***
4.	Intent to leave				–	−.61***	.49***	.36***	.06
5.	Subjective well-being					–	−.64***	−.45***	−.11**
6.	Psychological distress						–	.55***	.18***
7.	Suicidal ideation							–	.08*
8.	Gender								–
9.	Age								
10.	Workload								
11.	Life events								
12.	Dental medicine (1) versus medicine (0)								
13.	Veterinary medicine (1) versus medicine (0)								
14.	Students (1) versus residents (0)								
15.	Professionals (1) versus residents (0)								
Mean		5.40	5.96	4.51	2.74	.00	.00	.07	.77
Standard deviation		.97	.70	1.28	1.39	.89	.87	.17	.42
Theoretical range		1–7	1–7	1–7	1–7	–	–	0–2	0–1

	Variable	9	10	11	12	13	14	15
1.	Supervisors' autonomy support	−.01	−.28***	−.19***	−.05	.05	−.17***	.15***
2.	Colleagues' autonomy support	.02	−.21***	−.17***	.02	.04	−.16***	.18***
3.	Work satisfaction	−.04	−.28***	−.18***	.19***	.04	.03	.18***
4.	Intent to leave	.07	.13**	.17***	−.10*	−.01	.03	−.08*
5.	Subjective well-being	−.04	−.20***	−.22***	.11**	.02	.06	.09*
6.	Psychological distress	−.02	.20***	.29***	−.09*	−.02	.05	−.15***
7.	Suicidal ideation	.00	.08	.18***	−.04	.07	.07	−.04
8.	Gender	−.13**	−.09*	−.01	−.05	.08	.07	−.03
9.	Age	–	−.06	.06	−.01	.04	−.39***	.22***
10.	Workload		–	.12**	−.56***	−.23***	−.04	−.67***
11.	Life events			–	−.03	−.01	−.01	−.02
12.	Dental medicine (1) versus medicine (0)				–	−.20***	.15***	.59***
13.	Veterinary medicine (1) versus medicine (0)					–	.14***	.38***
14.	Students (1) versus residents (0)						–	−.26***
15.	Professionals (1) versus residents (0)							–
Mean		27.07	53.98	2.15	.22	.12	.17	.25
Standard deviation		3.78	15.08	1.72	.42	.33	.38	.43
Theoretical range		–	–	–	0–1	0–1	0–1	0–1

$n = 522$–597. Subjective well-being and psychological distress were computed from standardized variables. Codes for gender: *Men* = 0 and *Women* = 1

*$P < .05$; **$P < .01$; ***$P < .001$

testing. The critical alpha level was thus adjusted downward to .01. To maximize power, all participants who provided scores on all relevant variables in a given analysis were included, which resulted in a slightly different number of participants per analysis.

Supervisors' perceived autonomy support predicting outcomes

The first set of analyses tested if supervisors' perceived autonomy support predicted each outcome variable beyond

Table 2 Summary of hierarchical regression analyses for control variables and supervisors' autonomy support predicting outcomes

Step	Predictor variable	Outcome variables				
		Work satisfaction β	Intent to leave β	Subjective well-being β	Psychological distress β	Suicidal ideation β
1	Gender	−.19***	.08	−.15***	.22***	.08
	Age	−.06	.08	.01	.00	.01
	Workload	−.29***	.13†	−.20***	.17**	.10
	Life events	−.18***	.18***	−.22***	.28***	.14**
Profession dummy codes	Dental medicine (1) versus medicine (0)	.04	.00	−.03	.21*	.13
	Veterinary medicine (1) versus medicine (0)	.05	−.05	−.02	.16†	.20†
Career stage dummy codes	Students (1) versus residents (0)	−.04	.12	.06	−.07	−.04
	Professionals (1) versus residents (0)	−.08	.10	−.01	−.24†	−.11
	R^2	.15***	.06***	.12***	.17***	.05**
2	Gender	−.10**	−.01	−.07	.17***	.04
	Age	−.02	.04	.04	−.02	−.01
	Workload	−.10†	−.06	−.04	.05	.02
	Life events	−.08†	.08†	−.14***	.21***	.10†
Profession dummy codes	Dental medicine (1) versus medicine (0)	.16†	−.12	.07	.14	.08
	Veterinary medicine (1) versus medicine (0)	.11	−.11	.03	.13	.17†
Career stage dummy codes	Students (1) versus residents (0)	.01	.07	.11	−.10	−.06
	Professionals (1) versus residents (0)	−.14†	.16	−.06	−.20†	−.09
	Supervisors' autonomy support	.58***	−.60***	.49***	−.37***	−.27***
	R^2	.43***	.36***	.32***	.28***	.11***
	ΔR^2	.28***	.30***	.20***	.11***	.06***

$n = 459$–462. Gender was coded as follows: *Men* = 0 and *Women* = 1

***$P < .001$. **$P < .01$. †$P < .05$, nonsignificant due to the Bonferonni correction

the main effects of stressful life events and sociodemographic variables (i.e., gender, age, profession, career stage, and worked hours per week). Each outcome was regressed onto control variables at Step 1 and supervisors' perceived autonomy support at Step 2. Results showed that after controlling for differences in the number of stressful life events experienced by participants over the preceding year and sociodemographic variables, supervisors' perceived autonomy support significantly predicted each work-related outcome and psychological health indicator (see Table 2). More specifically, supervisors' perceived autonomy support predicted higher work satisfaction, F_{change} (1, 452) = 223.65, $P < .001$, $\beta = .58$, more subjective well-being, F_{change} (1, 452) = 134.63, $P < .001$, $\beta = .49$, lower intent to leave, F_{change} (1, 449) = 210.92, $P < .001$, $\beta = -.60$, less psychological distress, F_{change} (1, 452) = 71.79, $P < .001$, $\beta = -.37$, and lower suicidal ideation, F_{change} (1, 452) = 31.48, $P < .001$, $\beta = -.27$, after controlling for the impact of stressful life events and sociodemographic variables. Notably, supervisors' perceived autonomy support added between 6 and 30% of explained variance to what could be accounted for by control variables.

Gender, workload, and stressful life events were also related to outcome variables. Women tended to experience less work satisfaction and less subjective well-being, as well as more psychological distress than men. Experiencing a high number of stressful life events was related to less subjective well-being, and to more psychological distress and suicidal ideation. More stressful life events were also related to less work satisfaction and higher intent to leave. In addition, a higher number of working hours per week was associated to less work satisfaction, less subjective well-being, and more psychological distress. Health professionals' career stage (i.e., students, residents, and recent professionals) and age[4] had no significant impact on work-related outcomes and psychological health indicators. Finally, no difference was found between the three professions (i.e., dentists, physicians, and veterinarians; see Table 2 for more details).

[4] Results pertaining to career stage and age are not further interpreted given the restricted range of these variables.

Colleagues' perceived autonomy support predicting outcomes

A second set of analyses was conducted to verify if colleagues' perceived autonomy support could also predict health professionals' work-related outcomes and psychological health beyond what could be accounted for by control variables. Again, we regressed each outcome onto control variables at Step 1 and colleagues' perceived autonomy support at Step 2. Results of Step 2 showed that colleagues' perceived autonomy support significantly predicted each outcome when controlling for stressful life events and sociodemographic variables (see Table 3). More specifically, colleagues' perceived autonomy support accounted for an extra 4–14% of the outcome variables' variance. Colleagues' perceived autonomy support thus predicted higher work satisfaction, F_{change} (1, 466) = 88.88, $P < .001$, $\beta = .39$, lower intent to leave, F_{change} (1, 464) = 53.88, $P < .001$, $\beta = -.33$, greater subjective well-being, F_{change} (1, 466) = 67.66, $P < .001$, $\beta = .36$, less psychological distress, F_{change} (1, 466) = 26.08, $P < .001$, $\beta = -.22$, and lower suicidal ideation, F_{change} (1, 466) = 19.76, $P < .001$, $\beta = -.21$, above and beyond what could be explained by differences in the number of stressful life events and sociodemographic variables.

The combined effect of supervisors' and colleagues' perceived autonomy support on outcomes

A final set of hierarchical regression analyses was performed to examine if receiving autonomy support from colleagues influenced health professionals' work-related outcomes and psychological health above and beyond what could be explained by supervisors' perceived autonomy support. Each outcome was thus regressed onto supervisors' perceived autonomy support at Step 1 and onto colleagues' perceived autonomy support at Step 2. Table 4 displays the standardized regression coefficients and percentages of explained variance (ΔR^2) for each outcome.

As expected, after Step 2, colleagues' perceived autonomy support significantly added to the prediction of health professionals' work satisfaction, F_{change} (1, 471) = 7.63, $P < .01$, $\beta = .13$, subjective well-being, F_{change} (1, 465) = 11.39, $P < .001$, $\beta = .17$, and suicidal ideation, F_{change} (1, 467) = 10.80, $P < .001$, $\beta = -.18$, when we controlled for supervisors' perceived autonomy support. However, adding colleagues' perceived autonomy support to the equation did not reliably improve the prediction of health professionals' intent to leave, F_{change} (1, 465) = 1.91, $P = .17$, or psychological distress, F_{change} (1, 465) = 2.43, $P = .12$, above and beyond supervisors' perceived autonomy support. Overall, colleagues' perceived autonomy support

Table 3 Summary of hierarchical regression analyses for control variables and collegues' autonomy support predicting outcomes

Step	Predictor variable	Outcome variables				
		Work satisfaction β	Intent to leave β	Subjective well-being β	Psychological distress β	Suicidal ideation β
2	Gender	−.13**	.04	−.11**	.22***	.07
	Age	.02	.02	.04	−.03	.00
	Workload	−.19***	.05	−.12†	.14†	.06
	Life events	−.12**	.14**	−.17***	.25***	.12**
Profession dummy codes	Dental medicine (1) versus medicine (0)	.14	−.14	.01	.21†	.12
	Veterinary medicine (1) versus medicine (0)	.07	−.09	−.03	.17†	.20†
Career stage dummy codes	Students (1) versus residents (0)	−.01	.12	.10	−.07	−.05
	Professionals (1) versus residents (0)	−.13	.16	−.06	−.20	−.14
	Colleagues' autonomy support	.39***	−.33***	.36***	−.22***	−.21***
	R^2	.28***	.16***	.22***	.23***	.10***
	ΔR^2	.14***	.10***	.11***	.04***	.04***

n = 474–476. Control variables were entered at Step 1. Gender was coded as follows: *Men* = 0 and *Women* = 1

***$P < .001$. **$P < .01$. $^{\dagger}P < .05$, nonsignificant due to the Bonferonni correction

Table 4 Summary of hierarchical regression analyses for supervisors' and collegues' autonomy support predicting outcomes

Step	Predictor variable	Outcome variables											
		Work satisfaction			Intent to leave			Subjective well-being			Psychological distress			Suicidal ideation		
		β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
1	Supervisors' AS	.58***	.34***		−.55***	.30***		.51***	.26***		−.47***	.22***		−.32***	.11***	
2	Supervisors' AS	.50***			−.51***			.40***			−.42***			−.21***		
	Colleagues' AS	.13**	.35***	.01**	−.07	.31***	.00	.17***	.28***	.02***	−.08	.22***	.00	−.18***	.13***	.02***

$n = 468$–522

AS Autonomy support

***$P < .001$; **$P < .01$

added 1% to the prediction of work satisfaction, and 2% to the prediction of subjective well-being and suicidal ideation. Although somewhat small, these results are nonetheless important given the stringent nature of hierarchical regression analyses. Indeed, in these analyses, shared variance between supervisors' and colleagues' perceived autonomy support, which may reflect a general context of perceived autonomy support in the workplace, is attributed solely to supervisors, placing colleagues at a disadvantage.

In total, colleagues' and supervisors' perceived autonomy support explained a total of 35% of variance in health professionals' work satisfaction, 31% in intent to leave, 28% in subjective well-being, 22% in psychological distress, and 13% in suicidal ideation.[5]

Discussion

A first important finding of the present study is that both perceived supervisors' autonomy support and perceived colleagues' autonomy support predict health professionals' psychological health and work-related outcomes. It thus seems that the more health professionals perceive their supervisors and their colleagues to be autonomy supportive, the more they experience satisfaction at work and well-being, and the less they report intention to leave, psychological distress, and suicidal ideation. These results were obtained while controlling for health professionals' differences on sociodemographic variables and stressful life events.

Results also showed that colleagues' perceived autonomy support adds to the prediction of health professionals' work satisfaction, subjective well-being, and suicidal ideation above and beyond supervisors' perceived autonomy support. These findings confirm the importance of colleagues' perceived autonomy support as an independent predictor of health professionals' outcomes. Receiving autonomy-support from supervisors and from colleagues thus appears to be important for optimizing health

[5] Possible interaction effects were also tested for each outcome. Predictors (i.e., supervisors' autonomy support and colleagues' autonomy support) were centered prior to entering the regression equation and the interaction term was computed using the cross-product of these centered predictors (Cohen et al., 2003). The interaction term between supervisors' and colleagues' autonomy support added additional explained variance for only one outcome, namely work satisfaction ($R^2_{\text{change}} = .01$; F_{change} (1, 470) = 8.70, $P < .01$, $\beta = .12$). This interaction showed that the positive effect of colleagues' autonomy support on work satisfaction might be stronger when supervisors' autonomy support is also present. Given that work satisfaction may be considered as a general measure of people's adjustment at work, people may report enhanced satisfaction when they feel supported by both their supervisors and colleagues. Yet, because no significant interaction was found for the other dependent variables of the present study, this interaction should be replicated before it can be further interpreted.

professionals' work satisfaction and psychological experience (i.e., higher subjective well-being and lower suicidal ideation). However, colleagues' perceived autonomy support did not predict health professionals' intent to leave and psychological distress when common variance between supervisors and colleagues' perceived autonomy support was attributed to supervisors. The reasons why colleagues' perceived autonomy support appear to predict unique variance for some outcomes (i.e., work satisfaction, subjective well-being, suicidal ideation), but not others (i.e., intent to leave, psychological distress), are unclear. Further research is needed to clarify this issue.

The present findings have many theoretical implications. First, they extend Moreau and Mageau's (2011b) results to a larger and more diversified sample. They also show that supervisors' perceived autonomy support predicts professionals' work satisfaction in addition to psychological health. This result replicates, but with a sample of health professionals, past results on the positive impact of supervisors' autonomy-support on work-related outcomes (Blais and Brière 1992; Deci et al. 1989; Lynch et al. 2005). Second, the present findings contribute to the literature on the beneficial impact of perceived autonomy support in mutual relationships (e.g., friends and relatives; Deci et al. 2006; Williams et al. 2006) in showing that colleagues are an additional source of autonomy support that predicts positive outcomes. This finding suggests that positive outcomes can be derived from more egalitarian autonomy-supportive relationships, in addition to hierarchical ones. Last, the present research provides evidence for the unique contribution of colleagues' autonomy support to the prediction of work satisfaction, subjective well-being, and suicidal ideation after controlling for supervisors' autonomy support.

The present study also contributes to the field of dental medicine, medicine, and veterinary medicine. First, it identifies two predictors (i.e., supervisors' and colleagues' interpersonal style) of health professionals' psychological health and work-specific outcomes, which are grounded in an empirically validated theory (i.e., self-determination theory). These results were found while controlling for various confounds (e.g., gender, life events, and workload). Although supervisors' and colleagues' relationships have been previously identified as either a well-being resource (e.g., Bartram et al. 2009; Cohen and Patten 2005), a source of satisfaction at work (e.g., Daugherty et al. 1998), or a stressful aspect of health professionals' work (e.g., Daugherty et al. 1998; Firth-Cozens 1987; Gardner and Hini 2006; Kent 1987), little was known about which aspects of these relationships were determinant in the prediction of health professionals' work satisfaction and psychological health. The present study thus adds to previous research by providing evidence that the quality of relationships with supervisors and colleagues (i.e., defined as autonomy-supportive vs. controlling) is empirically associated with psychological health and work-related outcomes among health professionals.

Second, the present research adds to the literature on the impact of sociodemographic variables and stressors on health professionals' difficulties. For example, in line with some studies, the present research shows that women experience more psychological impairments than men (e.g., Brewin and Firth-Cozens 1997; Collier et al. 2002; Ford and Wentz 1984; Gardner and Hini 2006; Goebert et al. 2009; Hendrie et al. 1990; Hurwitz et al. 1987), and that negative life events are associated with psychological impairments (Tyssen et al. 2001; Tyssen et al. 2004). Higher workload was also related to less work satisfaction and lower psychological health, although this effect disappeared when the effect of supervisors' autonomy support was partialled out. In line with past research that shows that number of working hours is sometimes linked to psychological health (e.g., Martini et al. 2006; Puriene et al. 2008), and sometimes not (e.g., Baldwin et al. 1997; Firth-Cozens 2001; Tyssen and Vaglum 2002), this finding suggests that the impact of workload on psychological health and work satisfaction might depend on other factors (e.g., the interpersonal context).

Limitations and future research

Despite these contributions, the present study also presents limitations, which lead to future research. First, the present design was cross-sectional and all measures were reported by the same informant (i.e., health professionals). Relationships may thus be inflated by common variance due to shared methods. However, given that this research is based on an empirically validated theory, and that results are in line with theoretical predictions as well as with past research, one can feel confident that observed relationships are not spurious. An effort was also made to control for possible confounders (i.e., gender, age, worked hours per week, stressful life events, profession, and career stage). Future research should nevertheless attempt to replicate the present results using other sources of information (e.g., autonomy support reported by supervisors and colleagues), as well as more objective measures of outcomes (e.g., absenteeism rates due to emotional impairments, turnover rates).

A second limitation is the correlational design of the study, which cannot determine the direction of association between health professionals' interpersonal context and their work satisfaction and psychological health. Previous experimental studies, however, confirm the positive causal effect of autonomy-supportive context on effective functioning (e.g., Vansteenkiste et al. 2004, 2005; Williams and

Deci 2001), psychological health (Gurland and Grolnick 2003; Ryan et al. 1983), and work outcomes (Deci et al. 1989; see Moreau and Mageau 2011a, for a review). The present findings are also in keeping with previous longitudinal studies showing that autonomy-supportive contexts predict positive changes in individuals' psychological health (e.g., Black and Deci 2000) and other work-specific outcomes (e.g., acceptance of organizational change; Gagné et al. 2000). Nevertheless, longitudinal studies are needed to confirm these associations with health professionals. Experimental studies are also required to investigate the causal influence of autonomy support from mutual relationships (e.g., colleagues) on work satisfaction and psychological health.

A third limitation concerns the high correlation between supervisors' and colleagues' perceived autonomy support (i.e., $r = .63$). Many factors could have influenced the strength of this relation. For example, it may be due to methodological artefacts. Indeed, items measuring supervisors' and colleagues' perceived autonomy support were similar, which may have generated common variance. Participants' response pattern (i.e., the tendency to answer more or less extremely to all items) may also have contributed common variance. However, another explanation may be that supervisors who are more autonomy supportive create a particular work climate where autonomy support among colleagues is more likely to occur. Supporting this hypothesis, a study with veterinarians reveals a significant relationship between support given by the superior and support from the workplace (Heath 2002a). Future research is needed to further investigate the impact of supervisory styles on the quality of the relationships among colleagues. It is also possible that supervisors and colleagues adopt similar styles with a given person because they react to this person's personal attributes (e.g., competence, personality, motivation; Pelletier and Vallerand 1996). Finally, because self-reports were used, there is the possibility that a third variable (e.g., optimism, personality type) influenced both the participants' perception of their supervisors' and colleagues' style and their outcomes. It is important to note however that the third variable hypothesis could not account for the added variance explained by perceived colleagues' autonomy support. Nevertheless, future research should control for possible third variables.

A fourth limitation concerns the relatively low response rate. This may be due to the significant time commitment that this questionnaire represented. Indeed, the questionnaire required between 30 and 40 min to complete, which may have appeared long. Although health professionals who were invited to participate were randomly selected from the targeted population, the present results might only apply to those professionals who completed the questionnaire despite its length. It is possible that professionals who already experienced difficulties were more likely to complete the questionnaire than their less impaired counterparts because they wished to share their difficulties. Yet, the reverse is also possible. Health professionals who experienced high psychological health may have had more available resources to devote to the additional task of completing a questionnaire. Future research is needed to replicate the present study with a higher response rate.

A fifth limitation of the present research concerns its generalization to the entire dentists, physicians, and veterinarians population. Although participants came from various work settings (e.g., working in private practice or public institutions, in rural or urban areas) and differed in terms of their specialization (i.e., general practitioners vs. specialists) and work position, the present sample was limited to students in training and professionals at the beginning of their career. This sample was chosen because it is during this transition phase that health professionals are most likely to experience adaptation difficulties (Firth-Cozens 2001; Fritschi et al. 2009). Yet, the relative importance of supervisors and colleagues may be different according to one's career stage. On one hand, research shows that older veterinarians tend to make less use of support from other veterinarians and from their employers than younger veterinarians (Gardner and Hini 2006). On the other hand, more experienced health professionals are more likely to start their own private practice, which may create a context where colleagues become more important. Replication of this research with health professionals at different career stage is thus required in order to verify these propositions.

Another direction for future research would be to investigate the determinants of autonomy-supportive behaviors from supervisors and colleagues. For example, in the sport domain, the coach's personal values and beliefs (e.g., about optimal motivational strategies), the coaching context (e.g., highly stressful environments, feeling pressure to perform), and athletes' behaviors and motivation are suggested to influence autonomy-supportive coaching behaviors (Mageau and Vallerand 2003). Antecedents of autonomy support should also be explored in the work domain. Some factors such as highly demanding environments, the possibility of making fatal errors, patients suffering, and lack of resources might be factors leading to more controlling behaviors. These hypotheses require further investigation. Finally, the processes through which perceived colleagues' and supervisors' autonomy support influence psychological health and work satisfaction were not investigated in the present research. Past research suggests that supervisors influence health professionals' psychological health and work satisfaction by enhancing need satisfaction and self-determined types of motivation (Baard et al. 2004; Blais and Brière 1992; Deci et al. 2001;

Lynch et al. 2005; Roca and Gagné 2008). Future research is needed to replicate these findings with colleagues.

Practical implications

Keeping these limitations in mind, the present research bears practical implications. First, it underscores the importance of teaching supervisors in health professions how to be autonomy supportive with their subordinates. Interventions aimed at increasing autonomy support with managers have been successfully implemented in the workplace, and have had positive effects on employees (Deci et al. 1989; Hardré and Reeve 2009). Overall, autonomy support has been linked to a plethora of positive outcomes for individuals (e.g., greater concentration, better task performance, and deeper processing; see Moreau and Mageau 2011a, for a review), and should thus be highly beneficial to health professionals. Learning how to be more autonomy supportive could also have a favorable impact on health professionals' own practice. Indeed, previous findings indicate that when psychiatric care workers feel that their own autonomy is supported at work, their attitudes toward their patients are less controlling (Lynch et al. 2005). In turn, patients experiencing autonomy support from health-care providers are more self-determined toward their treatment (Lynch et al. 2005) and show better clinical outcomes (e.g., Williams et al. 1996, 1998a, b; 1999, 2005; Zeldman et al. 2004).

The present research also points to the importance of including colleagues in interventions aimed at reducing health professionals' work dissatisfaction and psychological difficulties. Previous research reveals that more than half of dentists complain of loneliness (55.4%). Feelings of loneliness at work and isolation concerns are also reported by veterinarians (Reijula et al. 2003), physicians (Maranda et al. 2006), and students in those professions (e.g., Hurwitz et al. 1987; Kent 1987). The use of effective teamwork may be one way to increase social support at work (Firth-Cozens 2000), autonomy, and work satisfaction (Roth et al. 2009). For more isolated professionals, colleagues' support could be provided through other means of communication (e.g., professionals' meetings, web forum, journals, etc.). Yet, for these interventions to be effective, the present study warns that colleagues need to be autonomy supportive.

Conclusion

Health professionals such as dentists, physicians, and veterinarians are often perceived as being self-sufficient and sometimes even as invincible or invulnerable (Maranda et al. 2006; O'Keefe 2002). As such, they are expected to perform and be efficient regardless of the context. Yet, this research shows that health professionals have psychological needs that have to be met in order for them to be psychologically healthy and derive satisfaction at work. In particular, health professionals need to evolve in social environments where supervisors and colleagues support their autonomy by providing choices, acknowledging their feelings, giving rationales, and avoiding controlling behaviors. By investigating the impact of colleagues' autonomy support, this research also points to the value of studying the larger social context to better understand and improve health professionals' experience at work and psychological health.

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References

Ahola, K., & Hakanen, J. (2007). Job strain, burnout, and depressive symptoms: A prospective study among dentists. *Journal of Affective Disorders, 104*, 103–110.

Anderson, N. H. (1968). Likableness rating of 555 personality-trait words. *Journal of Personality and Social Psychology, 9*, 272–279.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviours predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72*, 261–278.

Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology, 34*, 2045–2068.

Baldwin, P. J., Dodd, M., & Wrate, R. W. (1997). Young doctors' health-I. How do working conditions affect attitudes, health and performance? *Social Science and Medicine, 45*, 35–40.

Baran, R. B. (2005). Myers Briggs Type Indicator, burnout, and satisfaction in Illinois dentists. *General Dentistry, 53*, 228–234.

Bartram, D. J., Yadegarfar, G., & Baldwin, D. S. (2009). Psychosocial working conditions and work-related stressors among UK veterinary surgeons. *Occupational Medicine, 59*, 334–341.

Beck, A. T., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: The scale for suicide ideation. *Journal of Consulting and Clinical Psychology, 47*, 343–352.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education, 84*, 740–756.

Blais, M. R., & Brière, N. M. (1992). *On the mediational role of feelings of self-determination in the workplace: Further evidence and generalization*. Unpublished manuscript, Université du Québec à Montréal, Canada.

Blais, M. R., Lachance, L., Forget, J., Richer, S., & Dulude, D. M. (1991). *L'échelle de satisfaction globale au travail* [Work Satisfaction Scale]. Poster presented at the 1991 Annual Congress of the Société québécoise pour la recherche en psychologie. Trois-Rivières, Quebec, Canada.

Blais, M. R., Vallerand, R. J., Pelletier, L. G., & Brière, N. M. (1989). L'Échelle de satisfaction de vie: Validation canadienne-française du "Satisfaction with Life Scale" [French-Canadian validation of the Satisfaction With Life Scale]. *Canadian Journal of Behavioural Science, 21*, 210–233.

Bourassa, M., & Baylard, J. F. (1994). Stress situations in dental practice. *Journal of the Canadian Dental Association, 60*, 65–67.

Boxer, P. A., Burnett, C., & Swanson, N. (1995). Suicide and occupation: A review of the literature. *Journal of Occupational and Environmental Medicine, 37*, 442–452.

Brewin, C. R., & Firth-Cozens, J. (1997). Dependency and self-criticism as predictors of depression in young doctors. *Journal of Occupational Health Psychology, 2*, 242–246.

Brown, S., & Gunderman, R. B. (2006). Viewpoint: Enhancing the professional fulfillment of physicians. *Academic Medicine, 81*, 577–582.

Buchbinder, S. B., Wilson, M., Melick, C. F., & Powe, N. R. (2001). Primary care physician job satisfaction and turnover. *American Journal of Managed Care, 7*, 701–713.

Cable, D. M., & Judge, T. A. (1996). Person-organization fit, job choice decisions, and organizational entry. *Organizational Behavior and Human Decision Processes, 67*, 294–311.

Chirkov, V. I., & Ryan, R. M. (2001). Parent and teacher autonomy-support in Russian and U.S. adolescents: Common effects on well-being and academic motivation. *Journal of Cross-Cultural Psychology, 32*, 618–635.

Clark, D. C., Salazar-Gruesco, E., Grabler, P., & Fawcett, J. (1984). Predictors of depression during the first 6 months of internship. *American Journal of Psychiatry, 141*, 1095–1098.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Cohen, J. S., & Patten, S. (2005). Well-being in residency training: A survey examining resident physician satisfaction both within and outside of residency training and mental health in Alberta. *BMC Medical Education, 5*, 21.

Collier, V. U., McCue, J. D., Markus, A., & Smith, L. (2002). Stress in medical residency: Status quo after a decade of reform? *Annals of Internal Medicine, 136*, 384–390.

Council on Scientific Affairs. (1987). Results and implications of the AMA-APA Physician mortality project. Stage II. *JAMA, 257*, 2949–2953.

Croucher, R., Osborne, D., Marcenes, W., & Sheiham, A. (1998). Burnout and issues of the work environment reported by general dental practitioners in the United Kingdom. *Community Dental Health, 15*, 40–43.

Daugherty, S. R., Baldwin, D. C., Jr., & Rowley, B. D. (1998). Learning, satisfaction, and mistreatment during medical internship: A national survey of working conditions. *JAMA, 279*, 1194–1199.

de Man, A. F., Balkou, S., & Iglesias, R. (1987). A French-Canadian adaptation of the scale for suicide ideation. *Canadian Journal of Behavioural Science, 19*, 50–55.

de Man, A. F., Leduc, C. P., & Labrèche-Gauthier, L. (1993). A French-Canadian scale for suicide ideation for use with adolescents. *Canadian Journal of Behavioral Science, 25*, 126–134.

deCharms, R. (1968). *Personal causation*. New York: Academic.

Deci, E. L., Connell, J. P., & Ryan, R. M. (1989). Self-determination in a work organization. *Journal of Applied Psychology, 74*, 580–590.

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62*, 119–142.

Deci, E. L., La Guardia, J. G., Moller, A. C., Scheiner, M. J., & Ryan, R. M. (2006). On the benefits of giving as well as receiving autonomy support: Mutuality in close friendships. *Personality and Social Psychology Bulletin, 32*, 313–327.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality and Social Psychology, 53*, 1024–1037.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227–268.

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin, 27*, 930–942.

Denton, D. A., Newton, J. T., & Bower, E. J. (2008). Occupational burnout and work engagement: a national survey of dentists in the United Kingdom. *British Dental Journal, 205*, 382–383.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*, 71–75.

Ducharme, L. J., Knudsen, H. K., & Roman, P. M. (2008). Emotional exhaustion and turnover intention in human service occupations: The protective role of coworker support. *Sociological Spectrum, 28*, 81–104.

Dunlap, J., & Stewart, J. (1982). Survey suggests less stress in group offices. *Dental Economics, 72*, 46–54.

Dyrbye, L. N., Thomas, M. R., & Shanafelt, T. D. (2006). Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Academic Medicine, 81*, 354–373.

Eckleberry-Hunt, J., Lick, D., Boura, J., Hunt, R., Balasubramaniam, M., Mulhem, E., et al. (2009). An exploratory study of resident burnout and wellness. *Academic Medicine, 84*, 269–277.

Ey, S., Henning, K. R., & Shaw, D. L. (2000). Attitudes and factors related to seeking mental health treatment among medical and dental students. *Journal of College Student Psychotherapy, 14*, 23–39.

Firth-Cozens, J. (1987). Emotional distress in junior house officers. *British Medical Journal, 295*, 533–536.

Firth-Cozens, J. (2000). New stressors, new remedies. *Occupational Medicine, 50*, 199–201.

Firth-Cozens, J. (2001). Interventions to improve physicians' well-being and patient care. *Social Science and Medicine, 52*, 215–222.

Ford, C. V., & Wentz, D. K. (1984). The internship year: A study of sleep, mood states, and psychophysiologic parameters. *Southern Medical Journal, 77*, 1435–1442.

Fournier, S., Nolet, K., Dupré, M. P., Scavone, G., Ranger, F., Koestner, R., et al. (2010, May). Construction and validation of the perceived parental autonomy support scale (P-PASS). Paper presented at the 4th international conference on self-determination theory. Ghent University, Belgium.

Fritschi, L., Morrison, D., Shirangi, A., & Day, L. (2009). Psychological well-being of Australian veterinarians. *Australian Veterinary Journal, 87*, 76–81.

Gagné, M., Koestner, R., & Zuckerman, M. (2000). Facilitating acceptance of organizational change: The importance of self-determination. *Journal of Applied Social Psychology, 30*, 1843–1852.

Gardner, D. H., & Hini, D. (2006). Work-related stress in the veterinary profession in New Zealand. *New Zealand Veterinary Journal, 54*, 119–124.

Godwin, W. C., Starks, D. D., Green, T. G., & Koran, A., 3rd. (1981). Identification of sources of stress in practice by recent dental graduates. *Journal of Dental Education, 45*, 220–221.

Goebert, D., Thompson, D., Takeshita, J., Beach, C., Bryson, P., Ephgrave, K., et al. (2009). Depressive symptoms in medical students and residents: A multischool study. *Academic Medicine, 84*, 236–241.

Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., et al. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 27*, 191–197.

Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine, 9*, 139–145.

Grolnick, W. S. (2003). *The psychology of parental control: How well-meant parenting backfires*. Mahwah, NJ: Erlbaum Publishers.

Gurland, S. T., & Grolnick, W. S. (2003). Children's expectancies and perceptions of adults: Effects on rapport. *Child Development, 74*, 1212–1224.

Hafen, M., Jr., Reisbig, A. M., White, M. B., & Rush, B. R. (2006). The first-year veterinary student and mental health: The role of common stressors. *Journal of Veterinary Medical Education, 35*, 102–109.

Hardré, P. L., & Reeve, J. (2009). Training corporate managers to adopt a more autonomy-supportive motivating style toward employees: An intervention study. *International Journal of Training and Development, 13*, 165–184.

Hardy, M. A. (1993). *Regression with dummy variables*. Newbury Park, CA: Sage.

Heath, T. J. (2002a). Longitudinal study of veterinarians from entry to the veterinary course to ten years after graduation: Career paths. *Australian Veterinary Journal, 80*, 468–473.

Heath, T. J. (2002b). Longitudinal study of veterinarians from entry to the veterinary course to 10 years after graduation: Attitudes to work, career and profession. *Australian Veterinary Journal, 80*, 474–478.

Hem, E., Haldorsen, T., Aasland, O. G., Tyssen, R., Vaglum, P., & Ekeberg, O. (2005). Suicide rates according to education with a particular focus on physicians in Norway 1960–2000. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 35*, 873–880.

Hendrie, H. C., Clair, D. K., Brittain, H. M., & Fadul, P. E. (1990). A study of anxiety/depressive symptoms of medical students, house staff, and their spouses/partners. *Journal of Nervous and Mental Disease, 178*, 204–207.

Henning, K., Ey, S., & Shaw, D. (1998). Perfectionism, the impostor phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Medical Education, 32*, 456–464.

Hurwitz, T. A., Beiser, M., Nichol, H., Patrick, L., & Kozak, J. (1987). Impaired interns and residents. *Canadian Journal of Psychiatry, 32*, 165–169.

Jackson, C. (2007). The General Health Questionnaire. *Occupational Medicine, 57*, 79.

Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology, 49*, 194–200.

Kasser, V. G., & Ryan, R. M. (1999). The relation of psychological needs for autonomy and relatedness to vitality, well-being, and mortality in a nursing home. *Journal of Applied Social Psychology, 29*, 935–954.

Kassirer, J. P. (1998). Doctor discontent. *New England Journal of Medicine, 339*, 1543–1545.

Kennedy, S., Goggin, K., & Nollen, N. (2004). Adherence to HIV medications: Utility of the theory of self-determination. *Cognitive Therapy and Research, 28*, 611–628.

Kent, G. (1987). Stress amongst dentists. In R. Payne & J. Firth-Cozens (Eds.), *Stress in health professionals* (pp. 127–149). Oxford, England: Wiley.

Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling versus informational styles on intrinsic motivation and creativity. *Journal of Personality, 52*, 233–248.

Linehan, M. M. (1981). A social-behavioral analysis of suicide and parasuicide: Implications for clinical assessment and treatment. In J. F. Clarkin & H. Glazer (Eds.), *Depression: Behavioral and directive treatment strategies* (pp. 229–294). New York: Garland.

Lynch, M. F., Jr., Plant, R. W., & Ryan, R. M. (2005). Psychological needs and threat to safety: Implications for staff and patients in a psychiatric hospital for youth. *Professional Psychology: Research and Practice, 36*, 415–425.

Mageau, G. A., Ranger, F., Joussemet, M., Koestner, R., Moreau, E., & Forest, J. (2011). *Construction and validation of the perceived parental autonomy support scale (P-PASS).* Manuscript submitted for publication, University of Montreal, Quebec, Canada.

Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sport Sciences, 21*, 883–904.

Maranda, M. F., Gilbert, M. A., St-Arnaud, L., & Vézina, M. (2006). *La détresse des médecins: Un appel au changement. [Physicians' distress: A call for change]*. Quebec, Canada: Les Presses de l'Université Laval.

Martini, S., Arfken, C. L., & Balon, R. (2006). Comparison of burnout among medical residents before and after the implementation of work hours limits. *Academic Psychiatry, 30*, 352–355.

Maslach, C., & Jackson, S. E. (1982). Burnout in health professions: A social psychological analysis. In G. S. Sanders & J. Suls (Eds.), *Social psychology of health and illness* (pp. 227–251). Hillsdale, NJ: L. Erlbaum Associates.

Maslach, C., Jackson, S. E., & Leiter, M. P. (1997). Maslach burnout inventory: Third edition. In C. P. Zalaquett & R. J. Wood (Eds.), *Evaluating stress: A book of resources* (pp. 191–218). Lanham, MD: Rowman and Littlefield Publishers Inc.

Massé, R., Poulin, C., Dassa, C., Lambert, J., Bélair, S., & Battaglini, A. (1998). The structure of mental health: Higher-order confirmatory factor analyses of psychological distress and well-being measures. *Social Indicators Research, 45*, 475–504.

Moreau, E., & Mageau, G. A. (2011a). *Conséquences et corrélats associés au soutien à l'autonomie dans divers domaines de vie*. [Consequences and Correlates of Autonomy Support in Various Life Domains]. Manuscript submitted for publication, University of Montreal, Quebec, Canada.

Moreau, E., & Mageau, G. A. (2011b). *Promoting the psychological health of medical residents: The importance of autonomy support, self-concordance, and self-awareness.* Manuscript submitted for publication, University of Montreal, Quebec, Canada.

Muthén, B., & Kaplan, D. (1985). A comparison of methodologies for the factor analysis of non-normal Likert variables. *British*

Journal of Mathematical and Statistical Psychology, 38, 171–189.

Myers, H. L., & Myers, L. B. (2004). 'It's difficult being a dentist': Stress and health in the general dental practitioner. *British Dental Journal, 197*, 89–93.

Ng, T. W. H., & Sorensen, K. L. (2008). Toward a further understanding of the relationships between perceptions of support and work attitudes. *Group and Organization Management, 33*, 243–268.

Niemiec, C. P., Lynch, M. F., Vansteenkiste, M., Bernstein, J., Deci, E. L., & Ryan, R. M. (2006). The antecedents and consequences of autonomous self-regulation for college: A self-determination theory perspective on socialization. *Journal of Adolescence, 29*, 761–775.

O'Keefe, J. P. (2002). De l'aide lorsqu'on en a le plus besoin. [Help when we need it most]. *Journal de l'Association Dentaire Canadienne, 68*, 215.

O'Reilly, C. A., Chatman, J., & Caldwell, D. F. (1991). People and organizational culture: A profile comparison approach to assessing person-organization fit. *Academy of Management Journal, 34*, 487–516.

Pelletier, L. G., & Vallerand, R. J. (1996). Supervisors' beliefs and subordinates' intrinsic motivation: A behavioral confirmation analysis. *Journal of Personality and Social Psychology, 71*, 331–340.

Puriene, A., Aleksejuniene, J., Petrauskiene, J., Balciuniene, I., & Janulyte, V. (2008). Self-perceived mental health and job satisfaction among Lithuanian dentists. *Industrial Health, 46*, 247–252.

Rada, R. E., & Johnson-Leong, C. (2004). Stress, burnout, anxiety and depression among dentists. *Journal of the American Dental Association, 135*, 788–794.

Reijula, K., Rasanen, K., Hamalainen, M., Juntunen, K., Lindbohm, M. L., Taskinen, H., et al. (2003). Work environment and occupational health of Finnish veterinarians. *American Journal of Industrial Medicine, 44*, 46–57.

Reynolds, W. M. (1991). Psychometric characteristics of the Adult Suicidal Ideation Questionnaire in college students. *Journal of Personality Assessment, 56*, 289–307.

Roca, J. C., & Gagné, M. (2008). Understanding e-learning continuance intention in the workplace: A self-determination theory perspective. *Computers in Human Behavior, 24*, 1585–1604.

Roth, L. M., Markova, T., Monsur, J. C., & Severson, R. K. (2009). Effects of implementation of a team model on physician and staff perceptions of a clinic's organizational and learning environments. *Family Medicine, 41*, 434–439.

Ryan, R. M. (2005). The developmental line of autonomy in the etiology, dynamics, and treatment of borderline personality disorders. *Development and Psychopathology, 17*, 987–1006.

Ryan, R. M., Mims, V., & Koestner, R. (1983). Relation of reward contingency and interpersonal context to intrinsic motivation: A review and test using cognitive evaluation theory. *Journal of Personality and Social Psychology, 45*, 736–750.

Schernhammer, E. S., & Colditz, G. A. (2004). Suicide rates among physicians: A quantitative and gender assessment (meta-analysis). *American Journal of Psychiatry, 161*, 2295–2302.

Schotte, D. E., & Clum, G. A. (1982). Suicide ideation in a college population: A test of a model. *Journal of Consulting and Clinical Psychology, 50*, 690–696.

Shanafelt, T. D., Bradley, K. A., Wipf, J. E., & Back, A. L. (2002). Burnout and self-reported patient care in an internal medicine residency program. *Annals of Internal Medicine, 136*, 358–367.

Simpson, R., Beck, J., Jakobsen, J., & Simpson, J. (1983). Suicide statistics of dentists in Iowa, 1968 to 1980. *Journal of the American Dental Association, 107*, 441–443.

Soenens, B., Vansteenkiste, M., Lens, W., Luyckx, K., Goossens, L., Beyers, W., et al. (2007). Conceptualizing parental autonomy support: adolescent perceptions of promotion of independence versus promotion of volitional functioning. *Developmental Psychology, 43*, 633–646.

Sotile, W., & Sotile, M. O. (2002). *The resilient physician: Effective emotional management for doctors and their medical organizations*. Chicago, IL: American Medical Association Press.

Stack, S. (1996). Suicide risk among dentists: A multivariate analysis. *Deviant Behavior, 17*, 107–117.

Stack, S. (2001). Occupation and suicide. *Social Science Quarterly, 82*, 384–396.

Thoits, P. A. (1985). Social support and psychological well-being: Theoretical possibilities. In I. G. Sarason & B. R. Saranson (Eds.), *Social support: Theory, research, and applications* (pp. 51–72). Dordrecht, Netherlands: Martinus Nijhoff.

Thomas, N. K. (2004). Resident burnout. *JAMA, 292*, 2880–2889.

Tyssen, R., Hem, E., Gude, T., Grønvold, N. T., Ekeberg, Ø., & Vaglum, P. (2009). Lower life satisfaction in physicians compared with a general population sample: A 10-year longitudinal, nationwide study of course and predictors. *Social Psychiatry and Psychiatric Epidemiology, 44*, 47–54.

Tyssen, R., Hem, E., Vaglum, P., Grønvold, N. T., & Ekeberg, Ø. (2004). The process of suicidal planning among medical doctors: Predictors in a longitudinal Norwegian sample. *Journal of Affective Disorders, 80*, 191–198.

Tyssen, R., & Vaglum, P. (2002). Mental health problems among young doctors: An updated review of prospective studies. *Harvard Review of Psychiatry, 10*, 154–165.

Tyssen, R., Vaglum, P., Grønvold, N. T., & Ekeberg, Ø. (2000). The impact of job stress and working conditions on mental health problems among junior house officers. A nationwide Norwegian prospective cohort study. *Medical Education, 34*, 374–384.

Tyssen, R., Vaglum, P., Grønvold, N. T., & Ekeberg, Ø. (2001). Suicidal ideation among medical students and young physicians: A nationwide and prospective study of prevalence and predictors. *Journal of Affective Disorders, 64*, 69–79.

Vallerand, R. J. (1989). Toward a methodology for the transcultural validation of psychological questionnaires: Implications for research in the French language. *Canadian Psychology, 30*, 662–680.

Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology, 87*, 246–260.

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 76*, 483–501.

Ware, J. E., Jr., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Medical Care, 30*, 473–483.

Wasserman, I. M. (1992). Economy, work, occupation, and suicide. In R. W. Maris, A. L. Berman, J. T. Maltsberger, & R. I. Yufit (Eds.), *Assessment and prediction of suicide* (pp. 520–539). New York: Guilford Press.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*, 1063–1070.

Williams, G. C., Cox, E. M., Kouides, R., & Deci, E. L. (1999). Presenting the facts about smoking to adolescents: Effects of an autonomy-supportive style. *Archives of Pediatrics and Adolescent Medicine, 153*, 959–964.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology, 70*, 767–779.

Williams, G. C., & Deci, E. L. (2001). Activating patients for smoking cessation through physician autonomy support. *Medical Care, 39*, 813–823.

Williams, G. C., Freedman, Z. R., & Deci, E. L. (1998a). Supporting autonomy to motivate patients with diabetes for glucose control. *Diabetes Care, 21*, 1644–1651.

Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology, 70*, 115–126.

Williams, G. C., Lynch, M. F., McGregor, H. A., Ryan, R. M., Sharp, D., & Deci, E. L. (2006). Validation of the "Important Other" climate questionnaire: Assessing autonomy support for health-related change. *Families, Systems, & Health, 24*, 179–194.

Williams, G. C., McGregor, H. A., King, D., Nelson, C. C., & Glasgow, R. E. (2005). Variation in perceived competence, glycemic control, and patient satisfaction: Relationship to autonomy support from physicians. *Patient Education and Counseling, 57*, 39–45.

Williams, G. C., Rodin, G. C., Ryan, R. M., Grolnick, W. S., & Deci, E. L. (1998b). Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychology, 17*, 269–276.

Williams, G. C., Wiener, M. W., Markakis, K. M., Reeve, J., & Deci, E. L. (1994). Medical students' motivation for internal medicine. *Journal of General Internal Medicine, 9*, 327–333.

World Health Organization (2009, October). *Mental health: A state of well-being*. Retrieved November 16, 2009, from http://www.who.int/features/factfiles/mental_health/en/index.html.

Zeldman, A., Ryan, R. M., & Fiscella, K. (2004). Motivation, autonomy support, and entity beliefs: Their role in methadone maintenance treatment. *Journal of Social and Clinical Psychology, 23*, 675–696.